U.S ENERGY AND MINERAL NEEDS SECURITY AND POLICY

IMPACTS OF SUSTAINED INCREASES IN GLOBAL ENERGY AND MINERAL CONSUMPTION

BY

EMERGING ECONOMIES SUCH AS CHINA AND INDIA

BEFORE

THE SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES

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BY

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My name is Milton R. Copulos and I am President of the National Defense Council Foundation.

I would like to thank Chairman Gibbons and the Members of the Subcommittee for the opportunity to testify today.

America is rushing headlong into disaster. What is worse, however, is that it is a disaster of our own design.

Three decades ago, the Arab Oil Embargo made it clear that the nation's growing dependence on imported oil was reaching dangerous levels and threatened to jeopardize our economic and military security. Despite that dramatic demonstration of our vulnerability nothing has been done to address the problem.

At the time of the Arab Oil Embargo in 1973, we imported 34.8% of our oil. In 2004, imports averaged 62.9%, and on a volumetric basis were more than twice the level they were 30 years ago.

We may soon come to regret our complacency.

A confluence of factors has occurred that heightens the jeopardy we face from our profligate import dependence.

THE FIRST FACTOR: EMERGING ECONOMIES

On one front, we have skyrocketing demand, driven in large part by the frenetic pace of economic growth in nations such as China and India. Indeed, for the past decade China has experienced a growth rate of between 7% and 9%, with a phenomenal rate of 9.5% in 2004. India's GDP has grown at an average of 6% for the same period, hitting 8.2% in the first quarter of 2004. In contrast, U.S. GDP grew at 5.6% for the same period, and Japan at 5%.

Fueling this economic growth will require oil in increasing amounts. So much oil in fact, that the ability of current suppliers to produce it may be stretched to the breaking point.

To illustrate, oil consumption in developing countries is expected to rise by 3% annually over the next 20 years. This means it will increase from 14.5 million barrels per day in 2000 to 29.8 million barrels per day by 2025. Within this total Chinese oil consumption, which accounted for fully 40% of the growth in world oil demand over the past four years, is expected to rise from the 5.56 million barrels per day recorded in 2003 to 12.8 million barrels in 2025. Of this total, 9.4 million barrels per day are expected to be accounted for by imports.

India, too, is expected to see a dramatic rise in its oil consumption with a 28% increase projected for just the next five years.

Under the best circumstances, the competition for oil generated by the explosive economic growth of Asia will serve to put a tremendous upward pressure on prices, driving them well above the current $50 plus per barrel average. OPEC officials have said oil prices could rise to as much as $80 a barrel and they may well be correct. In fact, under the right circumstances the price could be even higher.

Under the worst circumstances, as our organization warned in a Los Angeles Times article five years ago, the competition for oil could lead to armed conflict – particularly with China. Lest this statement seem alarmist or far-fetched, I would note that the Chinese are, for the first time in their history, developing a *"blue water"* navy capable of operating beyond their shores, and their naval doctrine has been revised to provide for the projection of force in an arc running roughly 800 miles from their shoreline.

But, I said there was a confluence of factors, and the growth of global demand is just one of them. The other, equally important factor is the growing instability of the nations on which we rely for the bulk of our imports.

THE SECOND ELEMENT: UNSTABLE SUPPLIERS

Six nations, Canada, Mexico, Saudi Arabia, Venezuela, Nigeria and Iraq contribute 66.9% of all U.S. oil imports, equaling 42% of our total consumption. Of these, four, Saudi Arabia, Venezuela, Nigeria and Iraq account for 37.7% of our imports or 23.7% of the oil we use.

And that's where the danger lies.

September 11th 2001 changed forever the way we must view resource dependency. We must never allow ourselves to forget that one of al-Qaeda's principal objectives is to destroy the U.S. economy. Indeed, that is the reason the World Trade Center was selected as a target – it was a symbol of America's remarkable economic strength.

More important, al-Qaeda and its affiliates understand all too well that one way to bring about their goal of economic disruption is to disrupt our supplies of imported oil. If anyone harbors doubts that this is true, they need only look to al-Qaeda's December 11th 2004 statement which made the threat explicit stating:

> *"We call on the mujahideen in the Arabian Peninsula to unify their ranks and target the oil supplies that do not serve the Islamic nation but the enemies of this nation."*

Continuing the statement also urged that al-Qaeda followers:

> *"Be active and prevent them from getting hold of our oil and concentrate on it in particular in Iraq and the Gulf."*

As dramatic as the December 18th statement was, however, what it actually did was to officially sanction what was already going on.

For the past several years, America's transoceanic oil supplies have been under growing assault.

In October of 2001, Sri Lankan Tamil Tiger terrorists conducted a coordinated suicide attack on an oil tanker involving five small boats. Seven people were killed.

Eleven months later, al-Qaeda affiliated suicide bombers attacked and holed the French oil tanker Limberg in Yemen killing one crewman and causing a 90,000 barrel oil spill.

In the summer of 2002, Saudi Interior Ministry forces thwarted an al-Qaeda plot to attack and cripple the loading dock at Ras Tanura which handles 10% of the world's oil supplies.

A report by the Institute for the Analysis of Global Security documented over 100 attacks on oil pipelines between April of 2003 and April of 2004.

Last July gunmen stormed an oil tanker at anchor in Indonesia.

The list goes on and on, but the point is simple: if oil must cross an ocean to get here, it is not secure.

But external terrorists are not the only threat.

The facts show that three of our most important sources of oil imports are so insecure that relying on them is tantamount to playing Russian Roulette with all the chambers in the gun loaded. Together these nations account for over one-quarter of our transoceanic oil imports.

Let's take them in order of importance.

PLAYING RUSSIAN ROULETTE WITH OIL SUPPLIES

Saudi Arabia, the world's largest oil producer and location of one-fourth of the world's proved conventional oil supplies accounts for 12.1% of U.S. oil imports or roughly 7.6% of the oil we use.

With almost 40% of its population under the age of 15 and declining fortunes that have seen Saudi Arabia's per capita income drop by 80% adjusted for inflation since its peak a quarter century ago, the Desert Kingdom is rife with unrest – much of it directed at the West. Indeed, since May of 2003 90 people have been killed in terrorist incidents and foreign nationals have been urged to leave. It is true that the Saudi Interior Ministry is attempting to combat the terrorist threat to their country, and has arrested hundreds of al-Qaeda suspects, but the threat continues to grow. Moreover, over the past year, al-Qaeda cells operating in Saudi Arabia have increasingly targeted oil-related facilities for attack.

But even if terrorists do not disrupt the flow of Saudi oil, another concern has recently surfaced: the ability of the Desert Kingdom to maintain its production levels. Matthew Simmons of the Houston-based Simmons Company International set off a firestorm of controversy in petroleum industry circles with his analysis of Saudi Arabia's oil production capability. It is his contention that the failure of the Saudis to invest in maintaining its huge Ghawar oil field has undermined that nation's ability to *"surge"* production in response to market needs. The Saudis have always been viewed the supplier of last resort. If Simmons is correct, the prospect of global shortage is far greater than previously believed.

Venezuela provides 12.1% of U.S. oil imports equaling 7.4% of domestic consumption. With the election of Hugo Rafael Chavez Frias as President, relations between the U.S. and its fourth largest oil supplier entered a new era of hostility. A self-styled populist with close ties to Fidel Castro and terrorist groups operating both in Latin America and around the globe, he recently threatened to cut off oil shipments to the United States. Chavez is openly sympathetic to al-Qaeda. Moreover, he is cited in the latest edition of the State Department's *"Patterns of Global Terrorism"* report as having *"an ideological*

affinity" with Colombia's FARC and ELN terrorist groups. The State Department also says that weapons and ammunition captured from FARC rebels have been traced to official Venezuelan stocks and facilities. The situation in Venezuela is further complicated by internal strife that was manifest in a general strike that shut down that nation's oil industry for several months beginning in December of 2002.

Nigeria, which supplies 8.7% of U.S. oil imports accounting for 5.5% of our consumption, has been plagued with ethnic and political turmoil in the Niger Delta, its principal oil producing region. In 2004, an average of 145,000 barrels of oil per day was lost to theft and vandalism. Moreover, foreign oil workers and facilities have been a frequent target of violence. For example, in April of 2004 two Americans working for Chevron were attacked and killed, and in January of 2005, 300 armed villagers from the village of Owaza attacked two Royal Dutch Shell flow stations forcing the evacuation of 18 staff members.

In addition to security issues, serious questions have also been raised concerning Nigeria's reserve estimates with Royal Dutch Shell recently reducing the reserve estimates of its holdings their by 67%, or almost 1.5 billion barrels. Moreover, even if reserve estimates are accurate, Nigeria suffers from a lack of investment funds to maintain and expand its oil and gas production. This fact raises further question about Nigeria's ability to maintain current production levels in the years ahead.

OTHER OIL SUPPLY ISSUES

While terrorism and political instability are major sources of concern regarding transoceanic U.S. oil imports, they are not the only factors threats to transoceanic oil imports. Another important concern are the efforts by the emerging Asian economies to become major participants in the development of global oil resources, and especially such efforts directed at traditional U.S. suppliers.

On January 20th, the Chinese government signed agreements with Canada to help develop Canadian uranium mines and oil reserves. Among the areas of greatest interest to the Chinese are the Canadian tar sands deposits in Alberta province. The 175 billion barrels of recoverable oil trapped in Canadian tar sands represent a resource base two-thirds the size of Saudi Arabia's. In addition, China has expressed interest in investing $2 billion to purchase a 49% interest in a pipeline to carry oil 720 miles from Alberta to the northwest coast of British Colombia.

China's move to enter into oil production and development agreements with traditional U.S. suppliers is not limited to Canada. China already operates two oil fields in Venezuela and has signed an agreement to develop 15 declining fields in Zumano in eastern Venezuela. The Venezuelan government has also invited China to participate in exploration projects in the Orinoco belt, one of the world's richest oil deposits. China has also made overtures concerning oil exports to Mexico's national oil company, PEMEX.

It is not just the Chinese, however, that are fishing for oil in traditional U.S. waters.

India recently signed an oil cooperation agreement with Venezuela. The agreement is the most recent in a series of overseas oil development projects initiated by India's state-owned Oil and Natural Gas Corporation (ONGC). They also have projects underway in Russia, Vietnam, Sudan, Myanmar and Australia.

Clearly, competition for the world's oil resources will become increasingly strong in the years ahead. But oil is not the only natural resource which poses an import vulnerability danger to the United States. Nonfuel mineral imports, too, create an unacceptable economic and military vulnerability.

THE IMPORTANCE OF NONFUEL MINERALS

Few Americans give much thought to the important role nonfuel minerals play in our nation's economy. Yet, while it is not commonly understood, they are as essential to a modern industrial state as energy. In fact, 16.8% of U.S. GDP is a direct product of minerals and materials mining and processing.

To illustrate, in 2004, the value of nonfuel minerals produced in the United States totaled $44 billion. But that was just the tip of the iceberg. These raw minerals, along with minerals imports generated $418 billion in processed mineral materials. These processed minerals, in turn, added $1.97 Trillion in value to U.S. manufactured goods. All told, some $16.8% of U.S. GDP is directly linked to minerals and materials processing. As a result, one out of every six jobs in our economy is directly or indirectly tied to mineral production.

Yet as important as these commodities are to America's economic success, their supply is not assured.

TENUOUS SUPPLIES

We currently rely on foreign sources for 100% of seventeen important minerals. These range from gallium, which is used in such critical applications as the manufacture of semiconductors, computer chips and transistors to graphite, which is used for such high-tech products as fuel cells, and so-called *"nano-flakes,"* 20 micron thick graphite particles that have a broad range of applications from advanced computer technology to aerospace.

We are also dependent on foreign sources for 80% or more of another dozen key nonfuel minerals including titanium sponge, which has a wide range of important defense applications, including providing upgraded armor for the Abrams M1A2 tank; palladium, which is essential to catalytic chemistry, and tantalum which is essential to the manufacture of corrosion-resistant chemical equipment and microcircuitry.

Overall, the value of U.S. imports of raw and processed materials increased 30% between 2003 and 2004. More important, though, this increase occurred even though the tonnage

of materials imported declined. The reason for the price increase in the face of decreasing imports was simple: market competition.

As with oil, the competition for nonfuel minerals is intensifying, and as with oil, the primary reason for this intensification is the stunning increase in China's appetite for these commodities.

THE ROLE OF CHINA

As noted, China's GDP has been growing at an accelerated pace for two decades – in fact doubling in size every eight to ten years. An important aspect of this growth is that it has been largely the result of spending on capital goods and construction projects which are by their nature both energy and mineral intensive. The effect of the demand created by this spending has been to spark skyrocketing demand for nonfuel minerals and strain production and processing capabilities to the limit.

The extent of the current global shortage of some nonfuel minerals and materials is illustrated by the situation in regard to steel. In 2001, it was estimated that there was somewhere between 10% and 20% excess steel processing capacity around the globe. But in 2004, demand for steel was so strong that France petitioned the European Mining Commission to suspend antidumping duties.

Although Chinese officials indicate they plan to restrict their country's growth rate to around 8%, even that level of expansion will place a strain on world mineral markets. Therefore, as with oil, competition for nonfuel minerals between China and the industrialized nations of the world will remain a permanent fixture of the global economy.

ADDRESSING THE OIL IMPORT PROBLEM

Given that the perils of America's import dependence are a reality, the question is, how can the nation's vulnerability be reduced?

Perhaps the greatest irony arising from our current energy and minerals dilemma is that the answer has been at hand all along: make better use of what we have.

In saying this, I am not advocating some draconian plan that relies on effectively hamstringing the economy in the name of reduced energy use. Rather, I am saying that America does not suffer from a shortage of energy. The simple truth is that America's energy endowment is more than sufficient to provide for all of our needs, both today and in the future. The only real shortfall that we have is a shortfall of the political will to find innovative ways to fully utilize the resources we are blessed with.

For example, there currently are some 104 Trillion cubic feet of *"stranded"* natural gas resources in Alaska – gas than currently cannot reach market due to an inability to transport it. Alaska's natural gas could help reduce our dependence on imported oil, if

only we were able to find a way to get it where it is needed. In the long run, a gas pipeline could provide the means for transporting Alaskan gas to market, but it will take time to accomplish its construction, and time is a luxury we do not have.

Fortunately, there is another way to take advantage of this resource.

GAS TO LIQUIDS

The Fischer-Tropsch technology to convert natural gas to liquid fuels has existed since the 1920s. It is currently in use in South Africa to produce approximately 200,000 barrels of liquid fuel per day. It would be possible to build a mobile Fischer-Tropsch processing plant on Alaska's North Slope near Prudhoe Bay to convert the stranded gas to liquid fuels that could be transported by the Trans-Alaska Pipeline System.

In addition to helping reduce oil imports the project would have several added benefits.

First, the fuel produced in this manner would be extremely clean, and would thereby benefit the environment.

Secondly, as oil production at Prudhoe Bay continues to decline, it will, in the near future, fall to a level insufficient to sustain flow through the TAPS system. Therefore, a substantial amount of recoverable oil might be left behind because it could not be transported. The added volume of throughput generated by a gas-to-liquids plant would help sustain the levels needed to maintain TAPS operations and thereby significantly extend ultimate recovery from the Prudhoe Bay field.

A third benefit would be the ability to demonstrate the practicality of building mobile gas-to-liquids plants for use by the Armed Forces as a means of providing fuel in the field.

Perhaps the most important benefit, however, would be that in demonstrating the practicality of converting natural gas to liquids in the harsh Alaskan climate, the project would open the door to exploiting the vast methane hydrate resources that exist in Alaska.

METHANE HYDRATES

Methane Hydrates provide another potentially huge source of energy. They were discovered in the 1960s. They consist of methane gas trapped in a lattice-like ice and are found largely in ocean bottom sediments lying below 450 meters and in permafrost. The Energy Information Administration estimates that the United States methane hydrate resources in place hold 320,222 Trillion cubic feet of natural gas. This is the equivalent of 51.1 Trillion barrels of oil. More important, onshore methane hydrate deposits in Alaska are estimated to hold 519 Trillion cubic feet of natural gas, the equivalent of 82.9 billion barrels of oil.

What makes methane hydrates so promising is the fact that in December of 2003, a joint U.S., Japanese and Canadian research program to determine if methane hydrates could be produced reported their results. The answer was affirmative. According to officials involved in the project, it will be possible to produce these resources economically within a few years. Alaska's onshore methane hydrates, by themselves, would be sufficient to eliminate the need to import oil entirely.

But methane hydrates are not the only option.

OIL SHALE

The United States also holds 62.5% of the world's oil shale deposits. The oil shale reserves found in the Green River formation that extends through Wyoming, Colorado and Utah is estimated to hold some 130 billion barrels of recoverable oil. The Eastern Marine formation may hold as much as 400 billion barrels.

The earliest recorded production of oil shale occurred in Autun, France in 1929. Even as the first oil well was being drilled in the United States in 1859, the first commercial oil shale industry was beginning in Scotland. Production there ranged between 1 million and 4 million tons annually between 1881 and 1955. After 1955, competition from cheap oil imports caused production to gradually decline until 1962 when it ceased.

While interest in producing U.S. oil shale resources has surfaced whenever oil prices rose sharply in response to tight supplies, new oil discoveries would drive prices down and make oil shale an uneconomic alternative. Oil shale was in effect always a bridesmaid but never a bride. The need to be concerned over energy security coupled with rising prices may finally provide an incentive to take advantage of this prolific resource.

COAL

The United States is also richly endowed with coal resources. In fact, the U.S. is the *"Saudi Arabia"* of coal holding 25% of the world's recoverable coal reserves. Totaling 275.1 billion tons, U.S coal resources are sufficient to meet current production levels for 200 years. Like natural gas, the technology to convert coal to liquid fuels has been long known. Also, new advances in Clean Coal Technology have addressed many of the environmental concerns that previously caused objections to coal liquefaction and gasification. Moreover, as with oil shale, the concern over energy security coupled with the anticipated sustained high prices for oil may combine to make synthetic fuels produced from coal an economically viable alternative.

While alternatives like methane hydrates, oil shale and synthetic fuels from coal all provide options that could and should be pursued, there is another source of fuel to offset oil imports that warrants consideration: making full use of our domestic oil and gas resources.

CONVENTIONAL RESOURCES

Vast, undeveloped deposits of oil and natural gas lie in areas foreclosed to exploration. The Arctic National Wildlife Refuge, for example, holds what may be the last onshore *"Super Giant"* oilfield in North America. Further, the experience of developing the vast Prudhoe Bay oilfield has demonstrated that oil and gas exploration and production can be conducted in sensitive environments without causing irreparable harm.

Similarly, there are huge potential deposits of both oil and natural gas in offshore areas currently foreclosed to exploitation. As with the Arctic, much experience has been gained in developing offshore hydrocarbon deposits that shows such resources can be produced in an environmentally sound manner.

NEW TECHNOLOGIES AND ALTERNATIVE FUELS

In addition to developing our rich domestic energy endowment, it also makes sense to encourage both efficiency and non-hydrocarbon alternatives. One of the most promising new technologies is the hybrid electric vehicle. Although automobile manufacturers may well have initially introduced hybrids as a response to pressure from environmental interest groups, their public acceptance has far exceeded anything that could have been anticipated. As a consequence all of the major auto manufactures are seeking to expand their hybrid lines. A particularly interesting new development is the so-called *"plug-in"* hybrid electric which can achieve a fuel efficiency level of several hundred miles per gallon.

Alcohol fuels and other bio-based fuels also can help to offset some portion of oil imports. But in the end, it is also important to recognize that there are roughly 220 million privately owned cars and light trucks in the United States that will continue to require conventional fuels to operate. Since their average lifespan is 16.8 years, the need for conventional fuels will remain with us for decades to come. Therefore, options like gas-to-liquids, methane hydrates, oil shale and synthetic fuels as well as expanded production of conventional oil and gas resources will be necessary if import levels are to be reduced.

What is perhaps most critical in developing a plan to reduce America's oil import burden is to recognize that there is no single solution. Rather the answer is to do everything. We must take full advantage of both conventional and unconventional resources and encourage efficiency and new technologies.

ADDRESSING THE NONFUEL MINERALS PROBLEM

The problem of nonfuel minerals imports is somewhat more difficult to address than that of oil import dependence. The reason for this is that there are some mineral commodities that are not found within our borders. Therefore, any program to address nonfuel mineral imports must take a two-part approach.

As with domestic energy resources, our dependence on imports for some nonfuel minerals is the product of government restrictions. While it was the policy of the U.S. government to encourage domestic mineral development through the middle of the 20th century, a variety of laws and regulations were imposed beginning in 1964 that increasingly discouraged domestic mineral development.

Over the succeeding decades, more and more restrictive regulations have been added to the mix with the end result being the decline of our extractive industries. The impact of these rules is most dramatically illustrated by the fact that North American mineral firms only allocate between 7% and 10% of their exploration budgets to the search for domestic minerals.

Clearly, removing unreasonable or excessively restrictive regulations will go a long way towards reviving the domestic mineral industry and reducing the need to import those minerals that can be produced from domestic sources. There still remains, however, the problem of meeting the need for minerals that cannot be found at home. There are three ways in which this problem can be addressed.

The first step is to ensure that the government maintains adequate stockpiles of those strategic and critical materials we cannot produce for ourselves. History has demonstrated that no matter what the cost of maintaining a strategic stockpile may be, it is still cheaper than attempting to acquire critical materials in a time of crisis through the marketplace.

A second step is to encourage the recycling of those minerals that can be retrieved from abandoned equipment. For example, millions of automobiles are scrapped each year, and all of them have catalysts that contain platinum group metals. Many of these catalysts are retrieved so that the platinum group metals they contain can be recovered. We should ensure that they all are.

A third step is to aggressively research alternatives to those nonfuel mineral commodities we cannot produce for ourselves. In this way the need for imports can be permanently ended.

CONCLUSION

I began my testimony by saying that America was rushing headlong into disaster. I stand by that statement. Our transoceanic energy resources are already under assault and it is just a matter of time before forces hostile to our nation and what it stands for succeed in causing a major disruption of supplies. Whether it is the result of a terrorist act or an intentional embargo as occurred in 1973 is of little consequence. What is important is to understand that it is coming and coming soon – probably within the next two years. When it does happen we should not again find ourselves asking why nothing was done to prevent it.

Even if there is no supply disruption, however, there remains the fact that increasing competition for energy resources will continue to exert an upwards pressure on prices.

This holds out the prospect of high energy prices reducing economic growth, fueling inflation and further aggravating our balance of trade.

Most important, it also means that we will continue to export jobs abroad.

And also bear in mind that some portion of every dollar we spend to purchase transoceanic oil finds its way into the hands of people who intend to do us harm.

I also repeat that the disaster we are facing is of our own making. The United States is endowed with a resource base more than adequate to meet its needs – if only we are able to make full use of it.

The choice we face is simple. We can either find the political will to do those things necessary to break the shackles of oil and nonfuel mineral imports, or we can continue to stand idly by and allow events to overwhelm us. If we fail to find the courage to do what is right, we will have no one to blame but ourselves when the next crisis wreaks havoc throughout our economy.